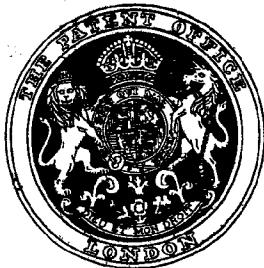


# PATENT SPECIFICATION

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747,701



Date of filing Complete Specification: Dec. 16, 1954.

Application Date: Dec. 16, 1953. No. 34966/53.

Complete Specification Published: April 11, 1956.

Index at acceptance:—Classes 4, A4; and 132(3), S2A, S19D(6:10).

## COMPLETE SPECIFICATION

### Improvements in Apparatus for Controlling Movements of Model Ships or other Toys

We, LINES BROS. LIMITED, a British company, of Tri-ang Works, Morden Road, Merton, London, S.W.19, do hereby declare the invention, for which we pray that a patent 5 may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

In a model ship or other toy remote control of some member is often necessary. In 10 a model ship this member may be the rudder, or say, davits carrying a model boat. In a model motor vehicle the steering gear may have to be moved by remote control. It is 15 possible to provide the toy with an electric motor which will respond to a radio signal by running normally in one direction and reversing when the signal is transmitted. If the signal is pulsed with a mark-space ratio 20 of 1:1 the motor will tend to oscillate rapidly about a mean position and in practice will remain stationary in that position. The problem that arises if such a motor is used is to convert its rotary movement into the 25 desired movement of the rudder or other controlled member, and to do this by a simple and cheap device which will not jam if the motor is allowed to turn for too long in either direction.

According to the invention a cable which shortens itself when twisted is used to interconnect a motor and a member movable against resistance so that this member is moved when the motor is turned to shorten 30 the cable. The term "cable" is used in this specification to mean a length of twisted strands of any suitable material; it may consist, for instance, simply of two strands of carpet thread twisted together or it may be 35 a length of string. It is not in itself resilient, the essential feature being that it changes in length when twisted.

In a model ship or toy it is of course  
[Price 3s. Od.]

generally essential for a member driven by a motor to be moved in either of two opposite directions, so the member must be subjected to a restoring force against which it is moved by the shortening of the cable. In general it is most convenient for this restoring force to be applied by a spring, but it may be applied by gravity. Thus davits in a model ship may be lowered under the action of gravity when the cable is untwisted and raised by the twisting of the cable.

The invention is particularly suitable for use with a radio-controlled reversible electric motor of the kind described above, but is also of general application in the transmission of motion in a toy from a reversible motor to a movable member.

The preferred apparatus is shown in the accompanying drawing. This apparatus is installed in a model ship to control the movement of the rudder, which is shown at 1 and is rigid with a rudder bar 2, the assembly of rudder and bar being pivotally mounted at 3. A reversible electric motor 4 responsive to radio control is driven by a battery not shown and rotates in one direction when there is no signal from the radio transmitter and in the other throughout the duration of a signal from that transmitter. The motor is connected through reduction gearing 5 to a toothed pin 6 which turns in a housing 7. A cable 8 consisting of two twisted strands of strong thread is anchored at one end to the pin 6 and at the other end in a hole 9 in the bar 2. A tension spring 10 is anchored at one end in a hole 11 in the bar 2 on the side of the side of the pivot 3 opposite to the hole 9 and at the other end to a bracket 12 to which the motor is fixed.

The cable 8 and spring 10 are adjusted so that when the motor is stationary the cable 8 is partly twisted and the rudder 1 is in the position shown in full lines. When the

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- motor runs in the direction in which the cable is twisted further and so shortened, the rudder moves anti-clockwise as seen in the drawing, i.e. the ship turns to starboard; and when the direction of the motor is reversed the spring 10 contracts as the cable lengthens, and the rudder is moved clockwise so that the ship turns to port. Two of the possible positions of the rudder are shown in dotted lines.
- It is obvious that the apparatus is simple and cheap. If the motor drives the rudder too far, no parts will jam. In practice, a substantial pull is exerted on the rudder with very little friction.
- What we claim is:—
1. An apparatus for transmitting power to a member in a model ship or other toy in order to move the member against resistance in which the member and an electric motor are interconnected by a cable the strands of which are twisted by the motor and which shortens in consequence, thus moving the member.
  2. A model ship or other toy embodying a member movable against a restoring force, a

reversible motor, a device turned by the motor through reduction gearing, and a cable which shortens itself when twisted attached at one end to the device turned by the motor and at the other end to the member to be moved, the member being moved in one direction by the shortening of the cable and in the other direction by the restoring force.

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3. A toy according to claim 2 in which there is a spring exerting the restoring force.

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4. A toy according to claim 3 in which the member is mounted to rock and is urged about its axis in one direction by the shortening of the cable and in the other direction by the spring.

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5. A toy according to claim 3 or claim 4 in which the motor is electric and responsive to radio control and its direction of rotation is determined by radio signals.

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6. A model ship according to claim 2, substantially as described with reference to the accompanying drawing.

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#### PROVISIONAL SPECIFICATION

### Improvements relating to Mechanical Models and Remote Control Apparatus for such Models

We, LINES BROS. LIMITED, a British company, of Tri-ang Works, Morden Road, Merton, London, S.W.19, do hereby declare this invention to be described in the following statement:—

The improvements relate to the manner in which the model or control apparatus is

supplied with the mechanical power necessary to move one or more of its members. According to this invention, the mechanical power is derived from the shortening which a cable undergoes when its strands are wound about one another. The winding or twisting of the strands is done by an electric motor.

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Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1956.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

**747,701** COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale.*

